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User Manual

Tektronix

VM700T Video Measurement Set
Option 1G Echo and Rounding Errors Measurements

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Preface

The VM700T Video Measurement Set Option 1G (2T Echo and Rounding of Black & White) gives you access to two measurements, named “Echo” and “Rounding Errors,” respectively. Echo determines whether or not a signal has too many echoes. Rounding Errors measures rounding of the black and white signal levels.

The Echo and Rounding Errors soft keys display in the Measure Mode Video Options directory window when Option 1G is installed in your VM700T.

To view the Video Options directory window, press the Measure button on the front panel. If the VM700T was in the Video Options directory when you last used Measure mode, the Video Options directory displays. Otherwise, touch the Video Options soft key at the bottom of the display to view the Video Options directory.

The manual contents are arranged as in the following order:

Configuring the Option describes how to configure the Echo and Rounding Errors Measurement option of the VM700T Video Measurement Set.

Operating Basics provides information on using the two measurements available with the VM700T Option 1G, Echo and Rounding Errors. The Echo measurement determines subjectively whether or not a television signal has too many echoes. Rounding Errors measures the rounding of white level and black level at specified times from the 50% point of the leading and trailing edge of Bar.

Remote Commands and Keywords describes the remote commands and keywords that are added to perform the option measurements and get measurement results. Abbreviated instructions for operating the instrument using remote control are also found in this section. For complete information about remote control, see the *VM700T RS-232 Interface Programmer Manual*.

Configuring the Option

Configuring the Option

The VM700T Video Measurement Set Option 1G (2T Echo and Rounding of Black & White) gives you access to two measurements, named “Echo” and “Rounding Errors,” respectively. Echo determines whether or not a signal has too many echoes. Rounding Errors measures rounding of the black and white signal levels.

The `Echo` and `Rounding Errors` soft keys display in the Measure Mode Video Options directory window when Option 1G is installed in your VM700T.

To view the Video Options directory window, press the Measure button on the front panel. If the VM700T was in the Video Options directory when you last used Measure mode, the Video Options directory displays. Otherwise, touch the `Video Options` soft key at the bottom of the display to view the Video Options directory.

Configuring the Echo and Rounding Errors option is similar to using the other video functions of the Video Measurement Set. A series of files and directories provide default parameters that the VM700T uses to measure video signals. If your application requires parameters other than the defaults supplied with the VM700T, you can configure the Echo and Rounding Errors option according to your preferences.

To configure and use new parameters in Echo and Rounding Errors measurements, you must perform the following tasks:

- Create your own Echo and Rounding limits file (for example, `Test_Set1`) and configure it with your limits.
- Create your own Video Source file (for example, `NewSource`) and select Test_Set1 (the new limits file you create) as the limits file to use.
- Configure the Source_Selection Video file to select the `NewSource` file as a source file for one or all of the channels (A, B, or C) as needed for your measurements.

The following text describes these configuring steps:

1. Press the Configure button to begin configuration of the Echo and Rounding Errors option. The screen displays a memory use indicator, information about instrument option versions, and four soft keys (touch-screen buttons) as shown in Figure 1–1.

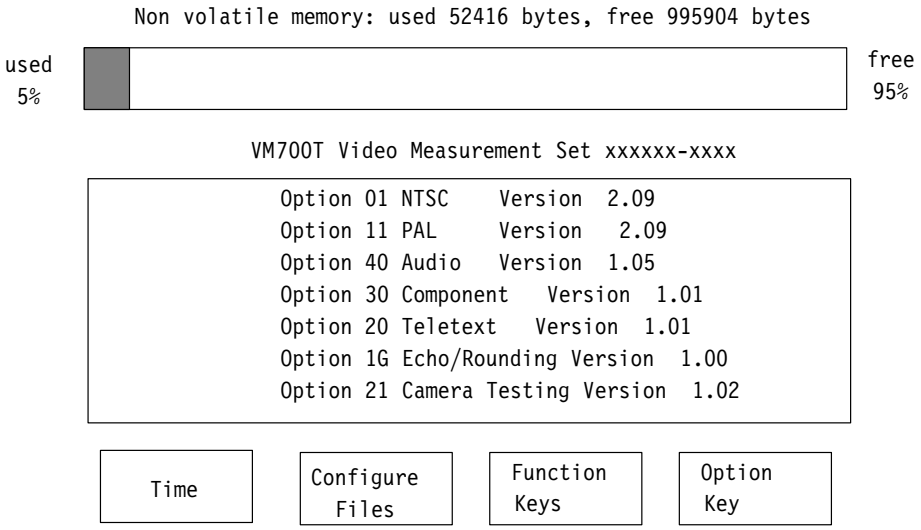

Figure 1–1: The VM700T Video Measurement Set Configure menu

2. Touch the `Configure Files` soft key to display the directories and files for configuration. The screen displays these directories and files in a window as shown in Figure 1–2. You can view all the menu choices by turning the front panel knob to scroll the choices up and down in the window.

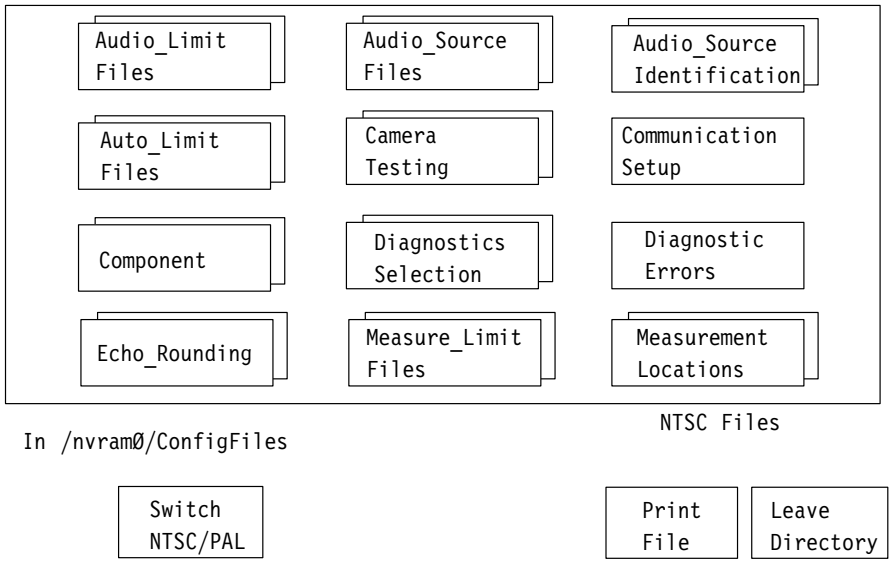

Figure 1–2: Configure menus choices

Configuring the Echo Rounding Limits Files

The following text describes the steps needed to configure the VM700T Echo and Rounding Errors option.

Touch the Echo_Rounding file soft key to enter the Echo Rounding limit file directory. The screen displays the system default file and (if any have been created) user limit files (see Figure 1–3). Touching a soft key displays the parameters in any file; parameters in the System Default file cannot be changed.

If the System Default Echo Rounding limits file is acceptable, the VM700T uses it (if it is the selected file) to measure input video signals. You can modify the Echo Rounding limits from the system defaults. Complete the following tasks to modify Echo Rounding limit file parameters.

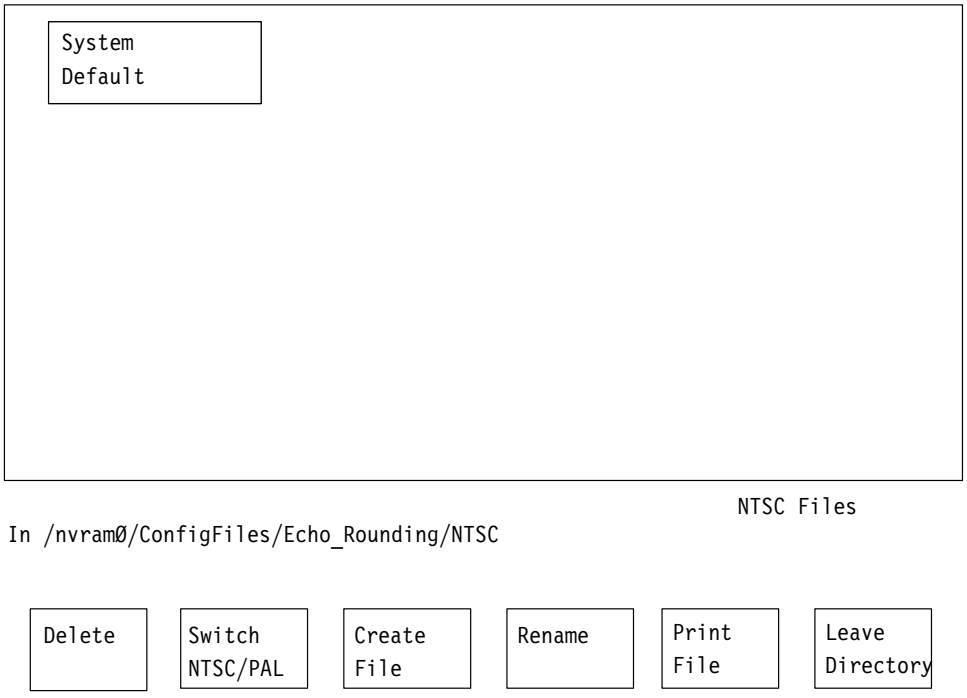

Figure 1–3: Echo_Rounding limit menu choices

Create a Video Limit File for Echo Rounding

1. Touch the Create File soft key. The query line (the top line of the display) asks you to select a file to use as a template for your new file.
2. Touch the soft key of the desired file (for example, System Default).
3. Type a name for your new file on the keyboard that displays (see Figure 1–4).

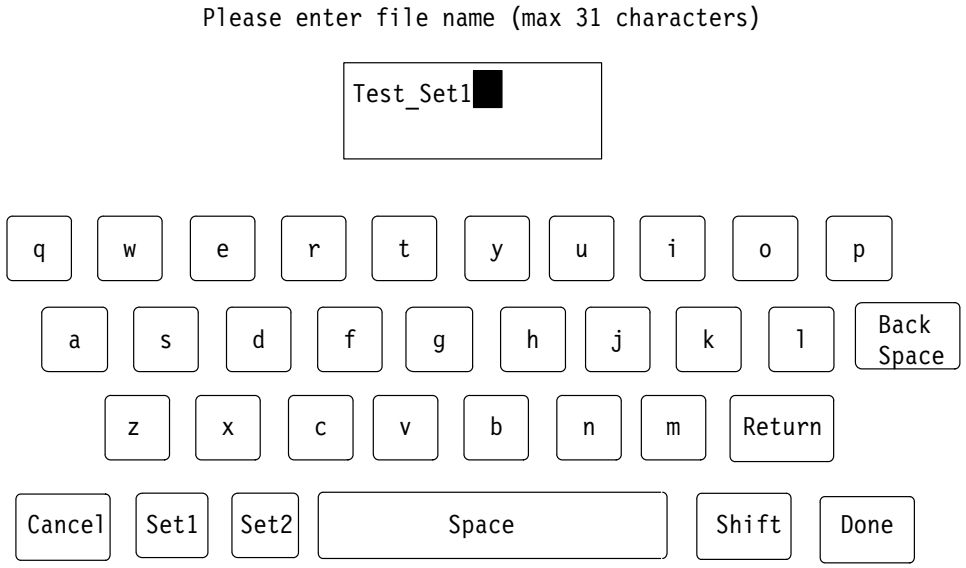

Figure 1–4: File naming keyboard

4. Touch the Done key when you have named the file. The VM700T displays the new file that contains the Echo and Rounding limits from the file you selected as the template. You can edit the parameters in this file.

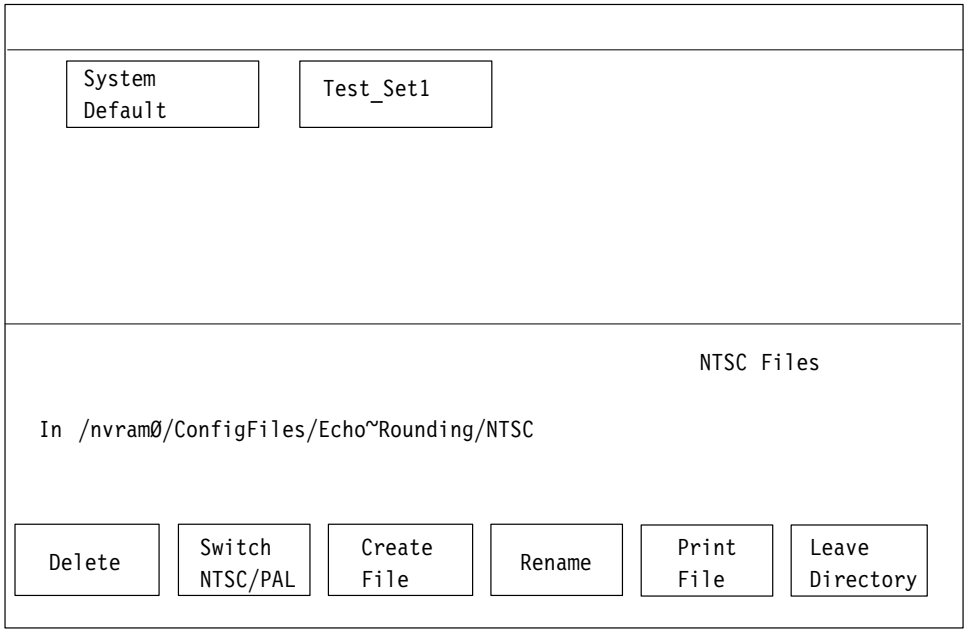

Figure 1–5: Creating a new file

Editing an Echo Rounding Limit Text Parameter

To change any Echo Rounding limit text parameter:

1. In the editable file, rotate the knob to highlight the line that contains the parameter you want to change. This includes the title line in the configuration file. Use a descriptive title to easily identify it later. (This does not change the name of the file.)
2. Touch the parameter you want to change. A box highlights the parameter.
3. Rotate the knob to increase or decrease the displayed value for the parameter.
4. Touch the `Accept Input` soft key to accept the change. The highlight box disappears, and the new parameter displays.

NOTE. *If you change a parameter and do not want to save the change, touch the* `No Change & Exit` *soft key. The VM700T asks you to touch the* `No Change & Exit` *soft key again to verify that you want to exit without changing anything.*

To display the file you created, touch its soft key.

When making extensive changes to a file, avoid losing changes by touching the `Update & Exit` *soft key after each change, then re-entering the file. That way, if you make a mistake and must exit the file, earlier work is retained while the most recent change (or mistake) is eliminated.*

Deleting a Modified Echo Rounding Limit File

To delete a modified Echo Rounding limit file:

1. Touch the `Delete` soft key in the Echo_Rounding files directory. The query line (the top line of the display) asks you to select a file to delete.
2. Touch the soft key of the file to delete. The file is deleted when its soft key completely disappears from the screen.

NOTE. *Touch the* `Cancel` *soft key (replaces the* `Delete` *soft key when deletion begins) to halt the deletion process. You can also halt file deletion by touching the file soft key.*

---

3. Touch the `Leave Directory` soft key to return to the Configure menu.

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Configuring the Video Source Files

Touch the Video_Source files soft key to enter the Video Source Files directory. The Video Source files are displayed.

Touching a soft key displays the parameters in a file; these parameters cannot be changed. To modify file parameters you must do the following:

- create a file
- select the existing file to use as a template
- name the file you created
- edit the information in the new file as needed
- accept the edits
- save the changes

If the system default video source file is acceptable, the VM700T uses this file as it performs video measurements. To change the Video Source file, complete the steps described in the following procedure.

Editing the Video Source File

To modify the Video Source file:

1. Touch the Create File soft key (see Figure 1–6). The query line (the top line of the display) asks you to select the file to use as a template for your new file.
2. Touch the appropriate soft key for the file you want to use (for example, System Default). A keyboard displays as shown previously in Figure 1–4.
3. Type the name for your new file.
4. Touch the Done key. The VM700T displays the contents of the new file that contains the Video Source data from the file you selected as the template. You can modify parameters in this file.

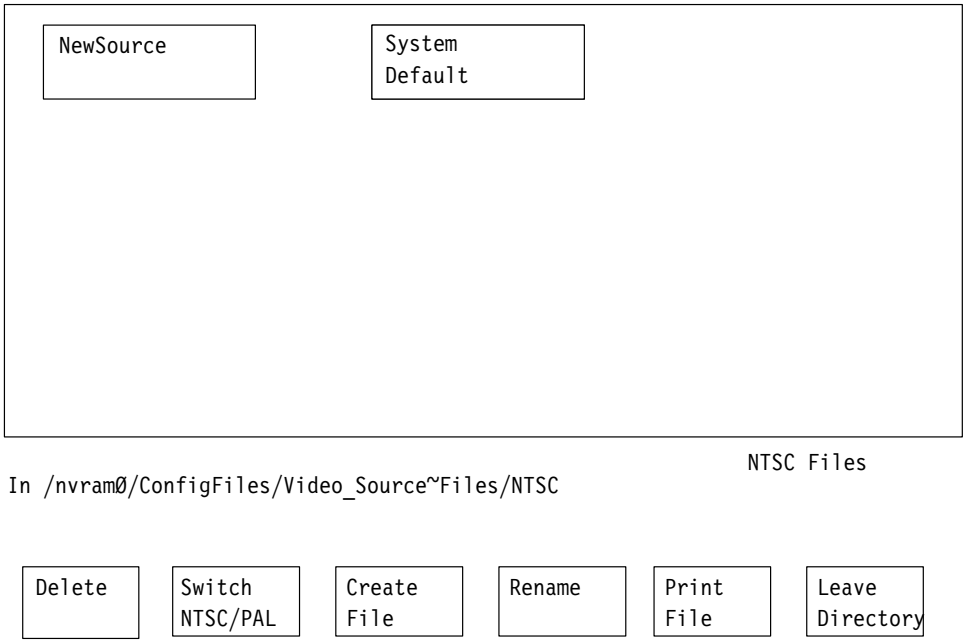

Figure 1–6: Selecting a file to use as a template

Changing the Video Source Parameters

To change the Video Source parameters:

1. Rotate the knob to highlight the line that contains the parameter you want to change (in this case, highlight the line "Echo and Rounding: System~Default").
2. Touch the desired parameter (for example, touch `Echo and Rounding: System~Default`). A box highlights the selected parameter.
3. Rotate the knob to change the parameter or value (select the name of the new Video Source file).
4. Touch the `Accept Input` soft key to accept the change. The highlight box disappears, and the new parameter displays.
5. Touch the `Update & Exit` soft key to save the change and return to the Video Source Files menu.

NOTE. *If you change a parameter and do not want to save the change, touch the* `No Change & Exit` *soft key. The VM700T asks you to touch the* `No Change & Exit` *soft key again to verify that you want to exit without changing anything.*

For more information about the other selections in the Video Source file, see the User manual for your NTSC, PAL, or dual-standard VM700T Video Measurement Set

Configuring the Source Selection Video Files

The Video Limit files used by the VM700T for video measurements are configured in the Video Limit Files directory and specified in the Video Source Files directory. Likewise, the Video Source files are configured in the Video Source Files directory and specified in the Source Selection Video directory.

You can select a Video Source file from the Source Selection Video (if you intend to use a source file other than the system default) for each of three sources.

Specifying a Video Source File

To specify a video source file:

1. Rotate the front panel knob until Source_Selection Video displays.
2. Touch the `Source_Selection Video` soft key. The Source_Selection Video file displays.
3. Rotate the front panel knob to highlight the source for which you are specifying a Video Source file (source A, B, or C).
4. Touch the highlighted source file to select it. A box highlights the selected file.
5. Rotate the front panel knob to change the Video Source file selection.
6. Touch the `Accept Input` soft key. The highlight box disappears and the new source displays.
7. Touch the `Update & Exit` soft key if the change is correct. The ConfigFiles menu displays. If the change is not correct, touch the `No change & Exit` soft key.

NOTE. *If you change the Video Source file and do not want to save the change, touch the* `Accept Input` *soft key, then touch the* `No change & Exit` *soft key. The VM700T asks you to touch the* `No Change & Exit` *soft key to verify that you want to exit the Source Selection Video directory and cancel any changes.*

Operating Basics

Operating Basics

This section provides information on using the two measurements available with the VM700T Option 1G, Echo and Rounding Errors. The Echo measurement determines subjectively whether or not a television signal has too many echoes. Rounding Errors measures the rounding of white level and black level at specified times from the 50% point of the leading and trailing edge of Bar.

Echo

The Echo display (Figure 2–1) plots the signal level as a percentage of the top-of-pulse level. The display also shows the measurement name (2T Pulse Echo), the waveform type, and the field (for NTSC) and line number of the measured signal.

The Curve 2 soft key displays a second graticule (Figure 2–2). This graticule is a fraction of Curve 1, the main graticule. The ratio of Curve 2 to Curve 1 can be selected, and it is expressed in dB relative to Curve 1. Echoes in the signal that are under Curve 2 are therefore below Curve 1 by at least the specified number of decibels. Figure 2–2 shows a typical Echo display with the Curve 2 graticule.

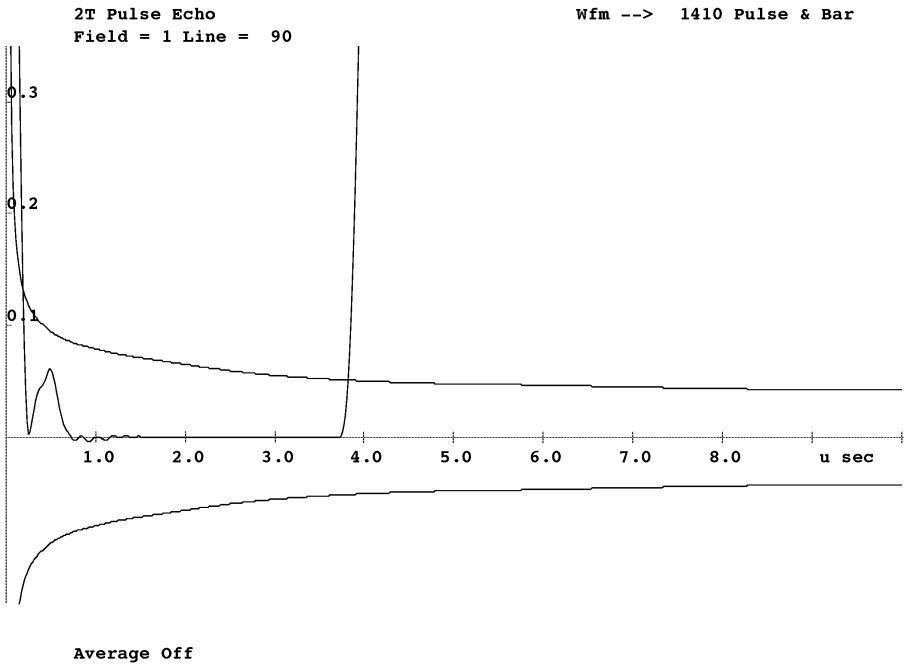

Figure 2–1: Echo display

The Echo measurement uses a 2T pulse signal. The pulse must be followed by blank space for as long as you want to measure echoes.

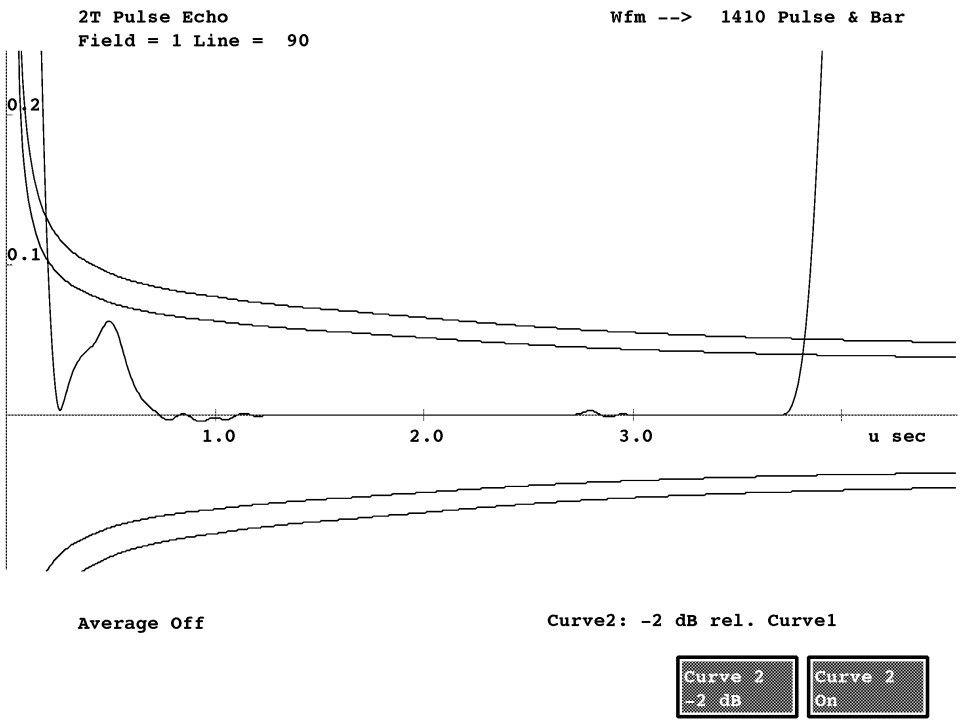

Figure 2–2: Echo display showing the Curve 2 graticule

Echo Menu

Pressing the Menu button when the Echo measurement runs displays the Echo main menu (Figure 2–3).

Main Menu

Average Num — `Average Num` specifies the weighting factor to use for averaging. The Average Num range is 1 to 256. The default value is 32. To change the Average Num value, touch the Average Num soft key to highlight it, rotate the knob until the desired weighting factor appears, then touch the Average Num soft key again.

Cursors — `Cursors` displays the Cursors submenu, which provides soft keys to move cursors along the waveform.

Grats `Grats` displays the Grats submenu which adjusts the value of curve 2, the second graticule.

Acquire `Acquire` displays the Acquire submenu, that defines a new position make the waveform measurement and (for PAL) selects whether only the +V Phase or –V Phase axis is acquired.

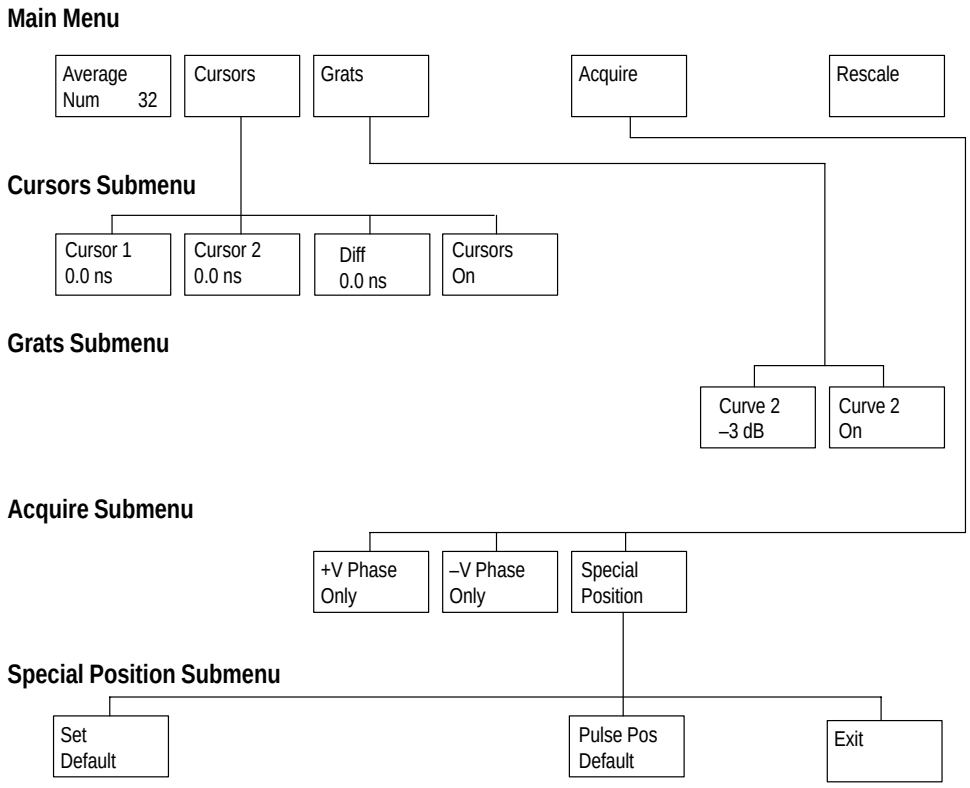

Figure 2–3: Echo menu tree

Rescale `Rescale` scales the display expansion to an appropriate factor for the Echo measurement's display graticule. The x- and y-axes adjust to accommodate the rescaled display.

Cursors Submenu

Cursor 1 — `Cursor 1` adjusts the horizontal position of cursor 1, displayed as a dashed vertical line. The display readout shows the time at the cursor position and the waveform value as a percentage of the waveform peak value. The cursor soft key also displays the time at the cursor position.

Cursor 2 — `Cursor 2` adjusts the horizontal position of cursor 2, displayed as a solid vertical line. The display readout shows the time at the cursor position and the waveform value in dB relative to the fixed graticule (curve 1). The cursor soft key also displays the time at the cursor position.

Diff — `Diff` displays the time difference between the cursors. This is not a selectable soft key.

Cursors On — `Cursors On` turns the cursors on or off for the Echo measurement.

Grats Submenu

Curve 2 (dB) — `Curve 2 (dB)` adjusts the level of curve 2 relative to the fixed graticule (curve 1) from 0 dB to –6 dB.

Curve 2 (ON/OFF) — `Curve 2 (ON/OFF)` turns curve 2 on or off.

Acquire Submenu

Special Position — `Special Position` displays the Special Position screen (Figure 2–3) and provides soft keys to set measurement locations for the Echo measurement.

+V Phase Only — `+V Phase Only` (PAL) measures only the +V phase part of the signal.

–V Phase Only — `–V Phase Only` (PAL) measures only the –V phase part of the signal.

Special Position Submenu

Set Default — `Set Default` resets the pulse location to its default value, found in the Measurement Locations file (Figure 2–4).

Pulse Pos Default — `Pulse Pos` defines the pulse location in the signal. When this soft key is highlighted, rotating the knob moves the pulse location.

Exit — `Exit` leaves the Special Position screen. The main Echo screen is displayed.

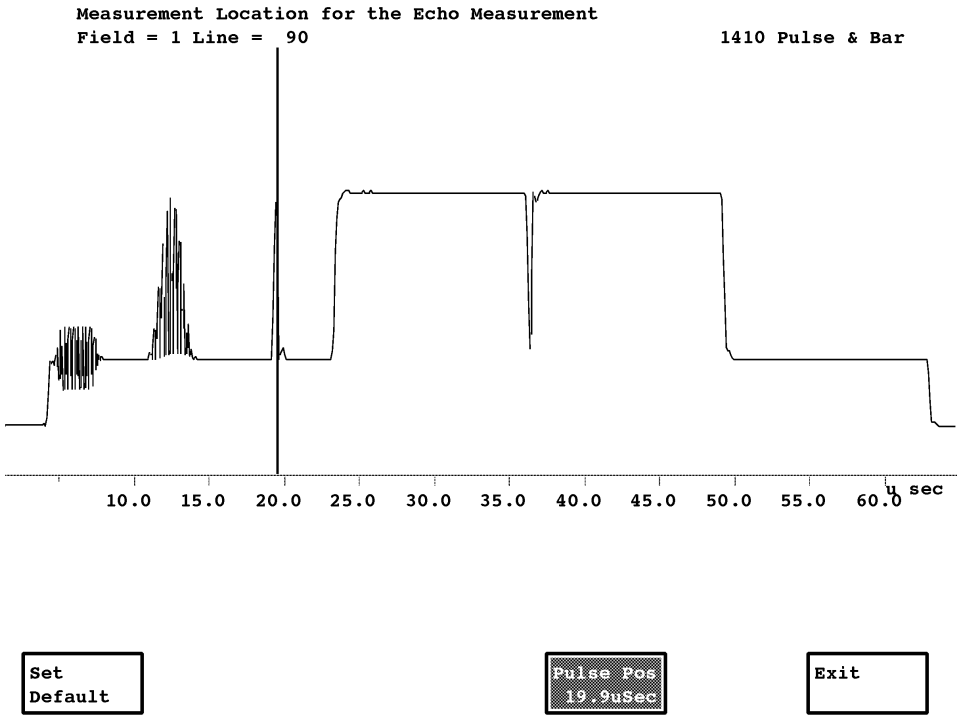

Figure 2–4: Echo Special Position display

Rounding Errors

Rounding Errors measures the rounding of white level and black level at specified times from the 50% point of the leading and trailing edge of Bar.

The Rounding Errors display (Figure 2–5) plots signal level as a percentage between the reference level (0%) and the bar level (100%). Text read-outs on the display show:

- measurement name (Rounding Errors)
- standard of the measurement signal (NTSC or PAL)
- waveform type
- field (for NTSC) and line number of the measured signal
- time period over which the measurement is taken
- percentage of rounding of white, black, or both (depending on the display setup, that can be controlled by menu soft keys)

The Rounding Errors measurement uses a bar signal.

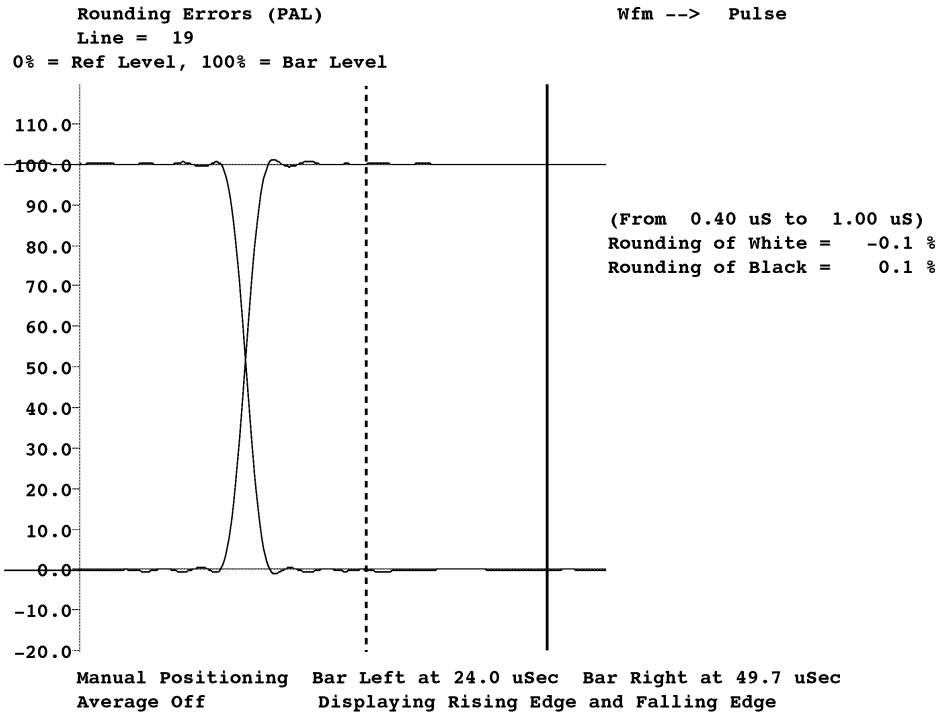

Figure 2–5: Rounding Errors display

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Rounding Errors Menu

Figure 2–6 shows the Rounding Errors menu tree structure. Pressing the Menu button when the Rounding Errors measurement runs displays the Rounding Errors main menu.

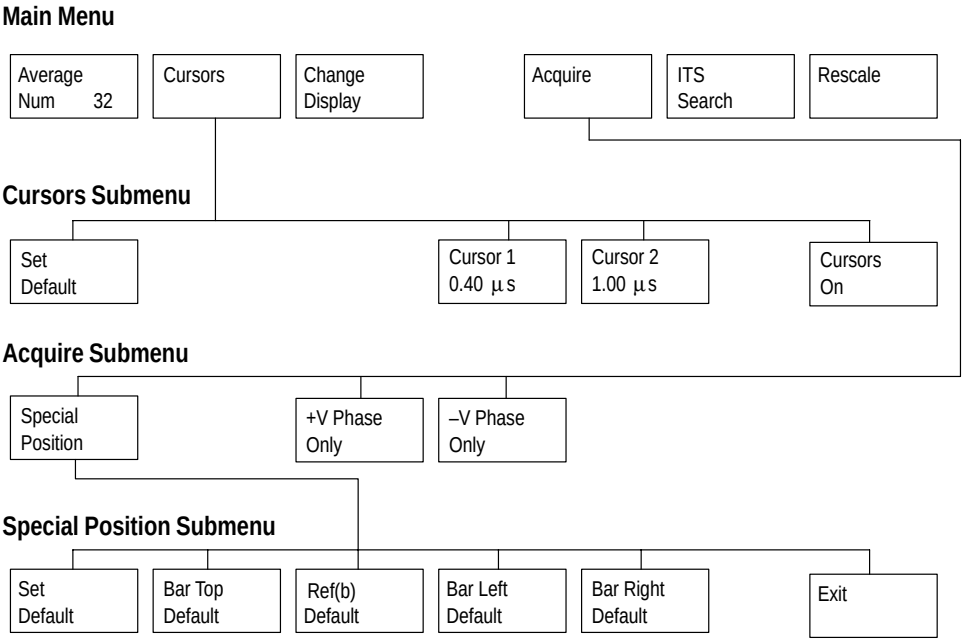

Figure 2–6: Rounding Errors menu tree

Main Menu

Average Num

`Average Num` specifies the weighting factor to use for averaging. The Average Num range is 1 to 256. The default value is 32. To change the Average Num value, touch the Average Num soft key to highlight it, rotate the knob until the desired weighting factor appears, then touch the Average Num soft key again.

Cursors

`Cursors` provides soft keys for cursor control. Cursors determine measurement locations. Defaults are 0.4 µsec and 1.0 µsec after the 50% point of the (rising or falling) edge.

Change Display — `Change Display` changes the display between Rising Edge only, Falling Edge only, and both Rising Edge and Falling Edge. The text readout on the display follows the selected graph.

Acquire — `Acquire` displays the Acquire submenu, which controls signal acquisition for the Rounding Errors measurement.

ITS Search — `ITS Search` searches the insertion test signals for a signal appropriate for the measurement. If an appropriate signal is not located, the message Not found displays briefly on the screen.

Rescale — `Rescale` sets the display expansion factor to an appropriate scale for the Rounding Errors measurement's display graticule. The x- and y-axes adjust to accommodate the rescaled display.

Cursors Submenu

Set Default — `Set Default` resets the selected soft key (either Cursor 1 or Cursor 2) to its default location. If neither is currently selected, both are reset. Cursor 1 defaults to 0.4 μsec and Cursor 2 defaults to 1.0 μsec, after the 50% crossing point of the rising or falling edge.

Cursor 1 — `Cursor 1` defines one of the two locations that determine the voltage levels and calculate the Rounding of the Black and White. A dashed vertical line in the graph represents cursor location. To move the cursor, highlight this soft key and rotate the knob.

Cursor 2 — `Cursor 2` defines one of the two locations that determine the voltage levels and calculate the Rounding of the Black and White. A solid vertical line in the graph represents the cursor location. To move the cursor, highlight this soft key and rotate the knob.

Cursors On — `Cursors On` enables/disables the cursors for use in the Rounding Errors measurement.

Acquire Submenu

Special Position — `Special Position` displays the Special Position screen (see Figure 2–7) and the Special Position submenu, which provides soft keys to set the measurement locations for the Rounding Errors measurement.

+V Phase Only `+V Phase Only` (PAL) measures only the +V phase part of the signal.

–V Phase Only `–V Phase Only` (PAL) measures only the –V phase part of the signal.

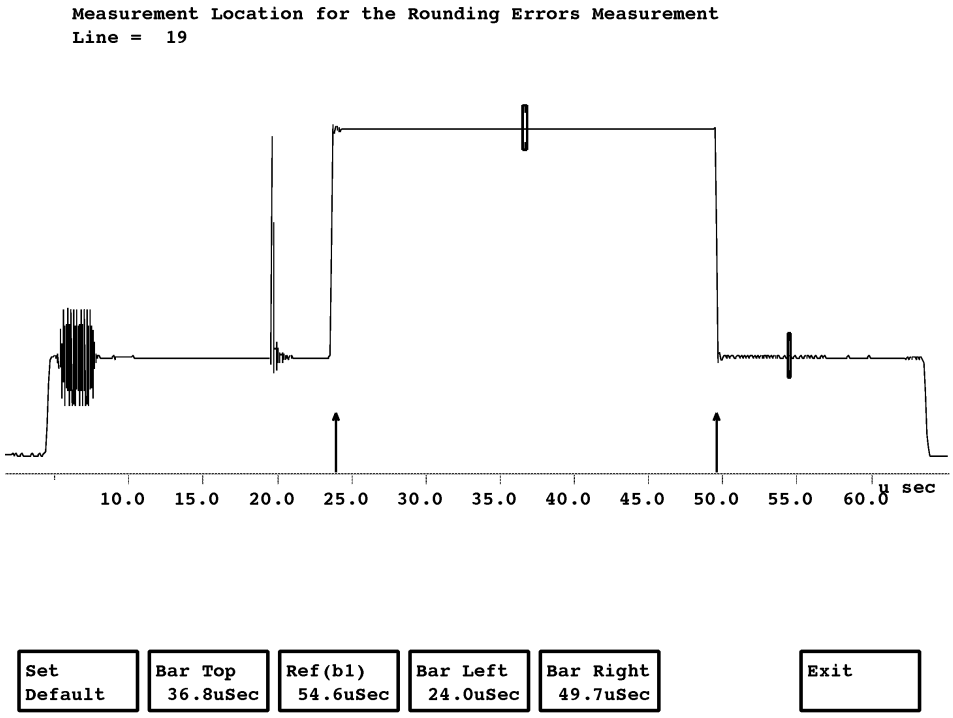

Figure 2–7: Rounding Errors Special Position display

Special Position Submenu

Set Default `Set Default` resets the selected soft key (Bar Top, Ref(bl), Bar Left, or Bar Right) to its default location. If none are currently selected, all are reset. The default locations are specified in the current Measurement Locations file.

Bar Top `Bar Top` defines the location of Bar Top, shown as a narrow rectangle on the display. Bar amplitude is the difference between the Bar Reference and Bar Top levels. With this soft key highlighted, rotate the knob to move the Bar Top position.

Ref (bl) — `Ref (bl)` defines the location of the Bar Reference, represented by a narrow rectangle in the graph. The Bar amplitude is the difference between the Bar Reference level and the Bar Top level. With this soft key highlighted, rotate the knob to move the Bar Reference position.

Bar Left — `Bar Left` defines the location of the leading edge of Bar, represented by an arrow in the graph. With this soft key highlighted, rotate the knob to move the Bar Left position.

Bar Right — `Bar Right` defines the location of the trailing edge of Bar, represented by an arrow in the graph. With this soft key highlighted, rotate the knob to move the Bar Right position.

Exit — `Exit` leaves the Measurement Locations display and returns to the Rounding Errors display.

Remote Commands and Keywords

Remote Commands and Keywords

You may use the serial (RS-232C) ports on the VM700T Video Measurement Set rear panel to remotely control the Echo and Rounding Errors functions. To use the remote control functions, you connect a terminal or computer to the VM700T at the RS-232C port with a correctly wired interconnect cable. With a computer, you also need a suitable VM700T terminal program such as the Tektronix VM Terminal (VMT) control software package. The VMT program offers a choice of either menu selection or command-line entry of VM700, VM700A, and VM700T remote commands.

See the *VM700T RS-232 Interface Programmer Manual* for information about configuring the VM700T serial ports for remote operation. The programmer manual discusses the RS-232C port requirements of the VM700T in detail and shows typical cable wiring configurations.

You may also control the VM700T remotely using the optional GPIB interface. The command set is the same for the VM700T; however, you will need a computer with a GPIB controller. A user-supplied controller program must also be provided to send the commands and receive the replies of the VM700T. Refer to the *VM700T Option 48 GPIB Interface Programmer Manual* for instructions on using the GPIB interface for remote control.

When operating the VM700T from a remote location you can do the following:

- Make a specific manual measurement or Auto mode series of measurements.
- Execute and interrupt a function (Function key).
- Temporarily change the configuration of a channel: limit files, selected measurement files, and measurement location files; printer type and port for each output type (Copy, Report, Log); specify an “End of File” character for printer output.

The remote commands that access the Echo and Rounding Errors functions are the same as those used for other VM700T functions. The command arguments are listed and described below.

The information in this section assumes that you are familiar with VM700T manual operation and principles of remote VM700T operation. For information on working with VM700T remote control commands, see the *VM700T RS-232 Interface Programmer Manual*. For the GPIB Option, refer to the *VM700T Option 48 GPIB Interface Programmer Manual*.

NOTE. *The following abbreviated explanation of remote commands assumes you understand the principles of VM700T remote operation and have access to the* VM700T RS-232 Interface Programmer Manual.

Command Format

The VM700T remote control commands uses the format shown in Table 3–1 as in the following example:

```
command [argument(s)]
```

Table 3–1: VM700T Remote Control Commands Format

Format	Description
command	The actual command name
[ ]	Optional arguments

A discussion of command usage and arguments follows the command header.

Note that `VM700>` is a prompt (which you can change), not an input.

Echo and Rounding Errors Remote Commands

You can use the following VM700T remote commands with the Echo and Rounding Errors option.

execute *application* The `execute` command starts the specified VM700T application. An application is one of the executable files (with exceptions noted below) found in the Instrument~Operations, VM700~Diagnostics, Video~Measurements, or Audio~Measurements directories in the Executable~Files directory. Selecting an operational mode application, such as Vector, is equivalent to pressing the front panel button: the LED on the selected button is lit. Selecting a measurement or diagnostic application is equivalent to touching the desired soft key.

Example:

```
VM700T> execute Rounding~Errors
```

You can run these Echo and Rounding Errors applications under remote control. Be sure to use the same capitalization and tildes (~) as shown:

```
Echo
Rounding~Errors
```

get *keyword* [*channel-letter*]

The `get` command returns the configuration file value specified by *keyword* on the channel specified by *channel_letter*. The keywords available are listed in Table 3–3 on page 3–5. The channel_letters available are A, B, or C.

Example:

```
VM700T> get HROB A
```

The above example returns the rounding of black as a percent value for channel A.

getresults

The `getresults` command stores Measure or Auto mode measurement results in default files in the Measurement~Results directory. In Measure mode, entering `getresults` with no argument(s) stores measurement results for the current measurement. If the system is not taking a measurement, the message `"Request not supported"` displays. If the system is making a measurement, the message `"Results in file:` *filename*`"` displays. Use the `show filename` command to view the results.

Example:

```
VM700T> getresults
Results in file: Bowtie
```

hardkey *button_name*

The `hardkey` command (hard key used as one word) indicates the press and release of the specified front panel button, *button_name*. Using the `hardkey` command is equivalent to entering `hardpress` and `hardrelease`; however, in general the `hardkey` command should be used instead of these commands.

Example:

```
VM700T> hardkey Menu
```

Front panel button names are listed in Table 3–2.

Table 3–2: Front Panel Button Names

A	Display	Picture
Auto	Freeze	SelectLine
Average	Graticule	Vector

Table 3–2: Front Panel Button Names (Cont.)

B	Help	Waveform
C	Menu	XY (Arrow selector)
Copy	MoveExpand	

NOTE. *The Configure, Function, and Measure buttons cannot be selected via remote.*

set *keyword* [*channel_letter*] *value1* [*value2 ...*]

The set command defines configuration values to use during the remote session. Table 3–3 list the keywords available to use with set. The channel_letter can be A, B, or C. The configuration values changed with set remain in effect until restored to their original (pre-remote) values with the restoreconfig command, or power to the instrument is switched off and back on. System line and other global variables can be changed with set but are not restored with the restore-config command.

Example:

```
VM700T> set IROB A –1.5 1.5
```

The above example changes changes the PAL rounding-of-black limits for channel A from their previous values to –1.5 to +1.5 percent.

show *filename*

The show command returns the contents of the specified filename. The default path is the Measurement~Results directory, but other files can be specified with a full pathname or a path relative to the Measurement~Results directory.

Example:

```
VM700T> show /nvram0/ConfigFiles/Source_Selection~Video
Video NTSC Video Source File Name  PAL Video Source File Name
-----------------------------------------------------------
Source A: NTSC System~Default                System~Default
Source B: PAL  System~Default                System~Default
Source C: NTSC System~Default                System~Default
Timed Events: System~Default
```

softkey *softkey_name*

The softkey (soft key used as one word) command indicates the press and release of a specified soft key, such as Cursors. The softkey command is equivalent to entering softpress and softrelease; however, in general the softkey command should be used instead of these commands.

Example:

```
VM700T> softkey Select_Graph
```

The general rule for forming a *softkey_name* is to take the spelling and capitalization from the soft key name on the display, omit the variable part and join the words with _ (underscore). For example, the *softkey_name* for the Noise 15.03 dB soft key is Noise_dB, and for 1H Display it is H_Display.

For soft keys that perform toggle operations (such as on/off), the soft key name is followed by a colon (:). For example, Plot: ON or Freq: LINEAR. The soft key displays the current status of the toggle. To name toggle keys, use the function name, with appropriate capitalization, up to (but not including) the colon.

Get and Set Keywords

The Echo and Error Rounding keywords used with the get and set commands are shown in Table 3–3. For each get/set keyword, the table shows the syntax of the set command and the get result, a description of what the keyword does, and the upper and lower limits of its range.

Table 3–3: Keywords: for get and set commands

Keyword	Description	Range
HROB	NTSC Rounding of black (%)	–50.00 to 50.00
HROW	NTSC Rounding of white (%)	–50.00 to 50.00
IROB	PAL Rounding of black (%)	–50.00 to 50.00
IROW	PAL Rounding of white (%)	–50.00 to 50.00

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